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(54) **Ladder rack for vehicles**

(57) Ladder rack (1) for vehicles, comprising a fixed frame (3) to be fastened to the roof of a vehicle (5), a movable support (7) pivoted in front to a portion (9) of said fixed frame (3) and comprising two parallel longitudinal guides (23) for housing a ladder (13), lifting means (17) having one end connected to said fixed frame (3) and the other end connected to said movable support

(7), said ladder rack (1) being able to take a first position wherein said fixed frame (3) and said movable support (7) are substantially parallel and a second position wherein said movable support (7) is lifted upward with respect to said fixed frame (3) through said lifting means (17), so as to allow the tailgate of said vehicle (5), on which roof said ladder rack (1) is mounted, to be opened completely.

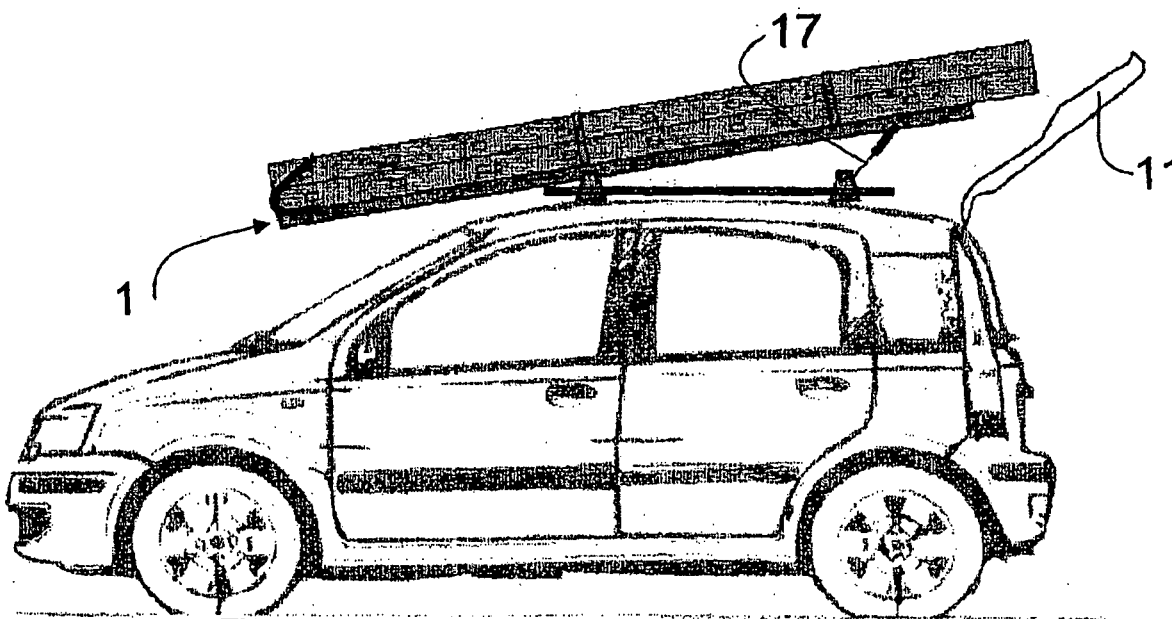


Fig. 1b

EP 1 707 439 A1

Description

[0001] The present invention relates to a ladder rack for vehicles.

[0002] More in particular, the present invention relates to a ladder rack for vehicles made in such a way as to allow to fully open the tailgate of the vehicle on which the ladder rack is mounted, without requiring the removal of a ladder housed on the ladder rack.

[0003] As known, many typologies of workers, such as craftsmen, workmen or even simple do-it-yourself enthusiasts, need to use ladders or other large objects in order to be able to carry out their work or hobby, and they often have to transport them to different places using a vehicle.

[0004] To this end, various types of ladder racks or generalized load carriers to be fastened to the roof of a vehicle are known, which allow anyone to easily transport a ladder or another bulky object on a vehicle.

[0005] However, some types of activities do not necessarily require the use of the ladder or other bulky object loaded on the vehicle, whereas the worker may need to be able to access the rear internal compartment of the vehicle in order to pick up tools or anything that might be useful for his activity.

[0006] When the ladder or other bulky object is housed on the roof of a vehicle, it may protrude beyond the length of the vehicle itself, thereby preventing the tailgate from being opened completely.

[0007] Various types of ladder racks for vehicles have been proposed which are made in such a way as to not interfere with the opening of the tailgate of the vehicle.

[0008] For example, the US patent US 5,884,824 describes a ladder rack to be fastened to the roof of a vehicle, wherein the ladder is loaded or unloaded laterally relative to the vehicle.

[0009] However, such a solution prevents from accessing the inside compartment of the vehicle from the side on which the ladder is loaded or unloaded, thus creating interference with one or more side doors of the vehicle.

[0010] This can be most disadvantageous when, with the ladder rack lowered, it is necessary to get into the vehicle from the side encumbered by the ladder rack or to get out of the vehicle from the obstructed side.

[0011] Moreover, a malfunctioning of the device described in the above-mentioned US patent may cause damage by scraping to the vehicle body.

[0012] Object of the present invention is therefore to provide a ladder rack for vehicles which allows to fully open the tailgate of a vehicle without interfering with any other door of the vehicle itself.

[0013] A further object of the invention is to provide a ladder rack for vehicles which can be adapted to most vehicles, in particular those for commercial use.

[0014] A further object of the invention is to provide a ladder rack for vehicles wherein the movements of the user of the ladder rack are minimized, thereby increasing the user's efficiency in terms of time.

[0015] Thanks to the particular realization of the ladder rack according to the invention, the user can load/unload a ladder or another bulky object from a vehicle and/or pick up material from within the vehicle through the tailgate while remaining at the rear of the vehicle and without having to move sideways.

[0016] These and other objects are achieved by the ladder rack for vehicles according to the invention, as claimed in the annexed claims.

[0017] The invention will now be described in detail with particular reference to the annexed drawings, supplied by way of non-limiting example, wherein:

- Figs. 1a and 1b show a schematic side view of a ladder rack according to the invention applied to a vehicle in the horizontal and tilted positions, respectively;
- Figs. 2 and 3 show a top view of a rear portion and a rear view of the ladder rack of Fig. 1, respectively.

[0018] Figs. 1a and 1b schematically illustrate a ladder rack 1 according to the invention, consisting of a fixed frame 3 to be fastened to the roof of a vehicle 5, and a movable support 7, which is pivoted in front to a portion 9 of the fixed frame 3.

[0019] The front coupling between the fixed frame 3 and the movable support 7 of the ladder rack 1 is accomplished by means of silent blocks, not shown. In the rest position, shown in Fig. 1a, the fixed frame 3 and the movable support 7 are substantially parallel, whereas in the tilted position, shown in Fig. 1b, the movable support 7 can be lifted relative to the fixed frame 3, preferably by about 15°.

[0020] The fixed frame 3 is supported by four support elements 21 arranged in such a way as to form the corners of a quadrilateral, preferably a rectangle, and fastened to the roof of the vehicle 5 in a known way.

[0021] A ladder 13, or another bulky object which may be housed in the ladder rack 1, is housed on parallel longitudinal guides 23, or side members, of the movable support 7, as shown in Fig. 2.

[0022] Thanks to suitable actuation means, which will be described later, a user can easily lift the movable support 7 of the ladder rack 1 relative to the fixed frame 3, thereby allowing the tailgate 11 of the vehicle 5 to be fully opened.

[0023] The lifting of the movable support 7 relative to the fixed frame 3 is obtained through suitable lifting means 17 which counteract the weight of the objects resting on the frame.

[0024] The lifting means 17 are connected on one end to the fixed frame 3 of the ladder rack 1 and on the other end to the movable support 7 of the ladder rack 1.

[0025] The lifting means 17 may consist of springs, gas springs, pistons, gas pistons, or other equivalent mechanical items.

[0026] The ladder 13 is retained laterally by side retention means 15, e.g. belts, and in front by stops 19,

consisting of tubular elements bent toward the rear of the vehicle 5, which prevent the ladder 13 from sliding toward the front of the vehicle 5 when the actuation means are actuated without the ladder 13 being retained to the ladder rack 1.

[0027] The rear portion of the ladder rack 1 according to the invention will now be described more in detail with reference to Figs. 2 and 3.

[0028] As illustrated, the rear coupling between the fixed frame 3 and the movable support 7 is accomplished through centering and retention pins 24.

[0029] The actuation means of the lifting means 17 comprise two latching members 25, being integral with the fixed support 3 and engaged in flanges 27, and two respective tie rods 29a, 29b being latched on one side to the respective latching members 25 through respective rings 26 and on the other side to a cylinder 31.

[0030] The latching members 25 lie on the support element 21 and have respective sliding latching elements 30 which, when the ladder rack 1 is in the lowered position, prevent the movable support 7 from being lifted.

[0031] A release lever 33 may take a first rest position, indicated by a continuous line, and a second actuation position, indicated by a dashed line.

[0032] Starting from the rest position, when the release lever 33 is turned anticlockwise, the cylinder 31 also turns anticlockwise and acts on the tie rods 29a, 29b, which are thereby withdrawn toward the cylinder 31.

[0033] In turn, the tie rods 29a, 29b act on the latching members 25 which, as the sliding latching element 30 retracts, it frees the movable support 7 and allows it to be easily lifted through the lifting means 17 with respect to the fixed frame 3.

[0034] The operation for lowering the ladder rack 1 to the rest position of Fig. 1a, wherein the movable support 7 is substantially parallel to the fixed frame 3, must be carried out manually.

[0035] In order to facilitate the loading and unloading of the ladder, the movable support 7 may be provided with rollers, not shown.

Claims

1. Ladder rack (1) for vehicles, comprising:

- a fixed frame (3) to be fastened to the roof of a vehicle (5);
- a movable support (7), pivoted in front to a portion (9) of said fixed frame (3), and comprising two parallel longitudinal guides (23) for housing a ladder (13) or another bulky object,
- lifting means (17) having one end connected to said fixed frame (3) and the other end connected to said movable support (7), said ladder rack (1) being able to take a first position wherein said fixed frame (3) and said movable support (7) are substantially parallel and a second position

wherein said movable support (7) is lifted upward with respect to said fixed frame (3) through said lifting means (17), so as to allow the tailgate of said vehicle (5), on which roof said ladder rack (1) is mounted, to be opened completely.

2. Ladder rack (1) according to claim 1, **characterized in that** said fixed frame (3) and said movable support (7) are pivoted in front by means of silent blocks, so as to allow said movable support (7) to turn approximately 15° relative to said fixed frame (3), and are coupled on the rear through centering pins (24).

3. Ladder rack (1) according to claim 1 or 2, **characterized in that** said ladder rack (1) also comprises actuation means (25, 29a, 29b, 33) adapted to move said ladder rack (1) to said first or said second position.

4. Ladder rack (1) according to claim 3, **characterized in that** said actuation means (25, 29a, 29b, 33) comprise a release lever (33).

5. Ladder rack according to claim 4, **characterized in that** said actuation means (25, 29a, 29b, 33) also comprise two latching members (25) and two respective tie rods (29a, 29b) being latched on one side to the respective latching members (25) and on the other side to a cylinder (31), said cylinder (31) being acted upon by said release lever (33) which, by turning said cylinder (31) anticlockwise, withdraws said tie rods (29a, 29b) toward it so as to allow said movable support (7) to be lifted with respect to said fixed frame (3).

6. Ladder rack (1) according to claim 5, **characterized in that** said latching members (25) have a latching element (30) which can slide on a flange (27) on which, in said first position, lie said parallel longitudinal guides (23).

7. Ladder rack (1) according to one or more previous claims, **characterized in that** said fixed frame (3) is fastened to the roof of said vehicle (5) by means of four support elements (21), substantially arranged in such a way as to form the corners of a quadrilateral, so as to support said fixed frame (3).

8. Ladder rack (1) according to one or more previous claims, **characterized in that** it comprises side retention means (15), preferably consisting of belts.

9. Ladder rack (1) according to one or more previous claims, **characterized in that** it comprises of front stops (19), preferably consisting of tubular elements bent toward the rear of said vehicle (5), which prevent said ladder (13) from sliding toward the front of said

vehicle (5) when said actuation means (25,29a,29b, 33) are actuated without said ladder (13) being retained to said ladder rack (1).

10. Ladder rack (1) according to one or more previous claims, **characterized in that** said lifting means (17) are springs, gas springs, pistons, gas pistons, or other equivalent mechanical items. 5
11. Ladder rack (1) according to one of the previous claims, wherein said movable support (7) comprises rollers for facilitating the loading and unloading of said ladder (13) from said support (7). 10

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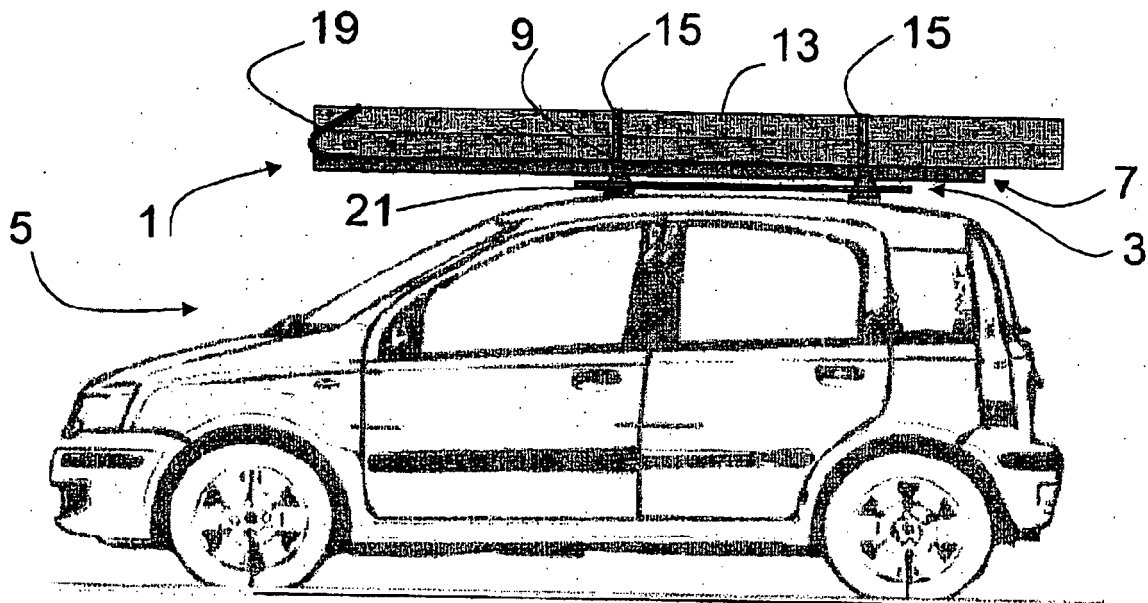


Fig. 1a

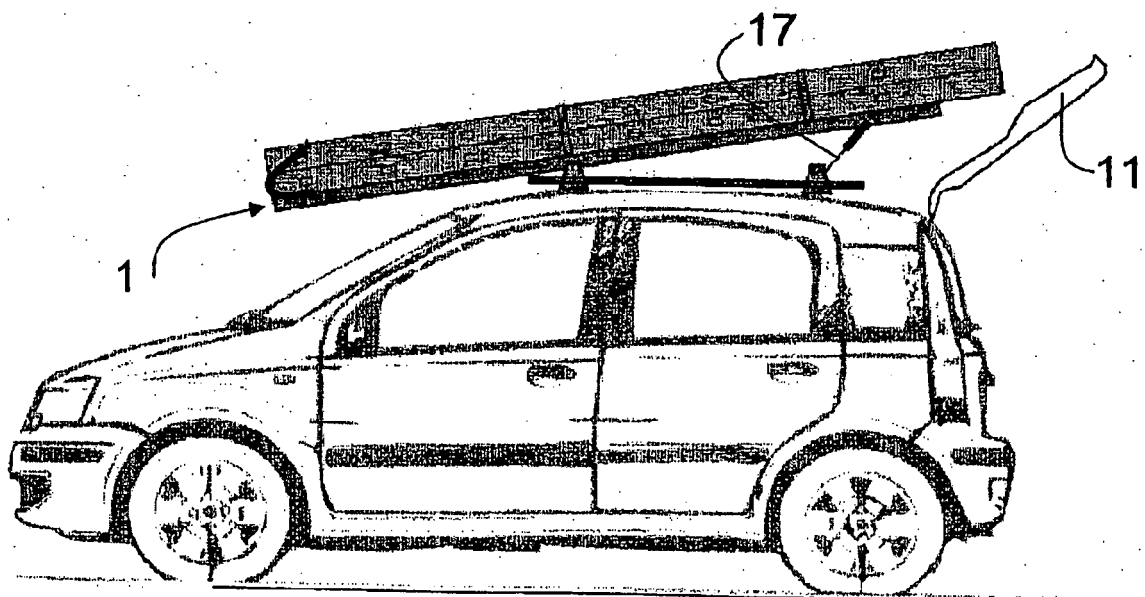


Fig. 1b

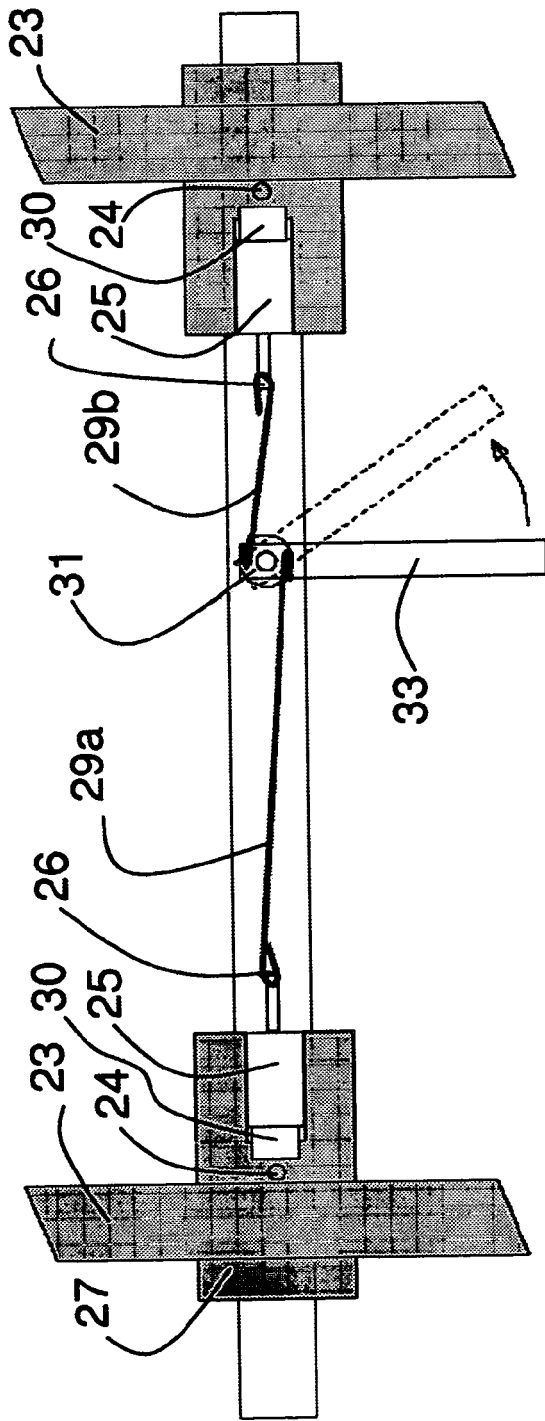


Fig. 2

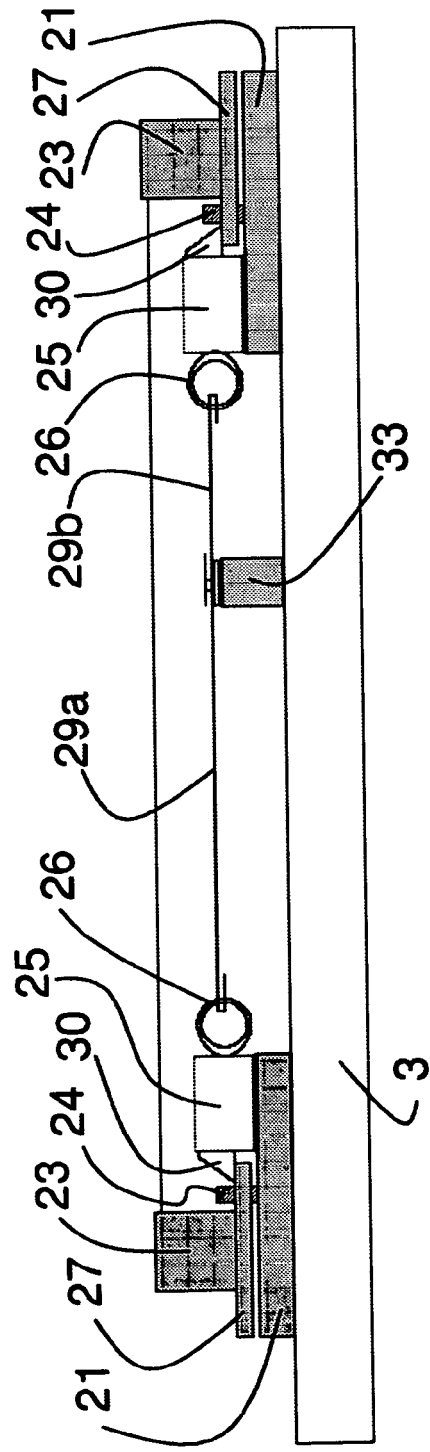


Fig. 3



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EUROPEAN SEARCH REPORT

Application Number
EP 06 11 1331

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	PATENT ABSTRACTS OF JAPAN vol. 008, no. 262 (M-341), 30 November 1984 (1984-11-30) & JP 59 134026 A (NISSAN JIDOSHA KK), 1 August 1984 (1984-08-01) * abstract *	1	INV. B60R9/04
A	US 2003/052145 A1 (AFTANAS JEFFREY M ET AL) 20 March 2003 (2003-03-20) * paragraph [0006]; figures 1,2 *	1	
A	EP 1 104 718 A (FORD GLOBAL TECHNOLOGIES, INC; FORD GLOBAL TECHNOLOGIES, LLC) 6 June 2001 (2001-06-06) * figure 3 *	1	
D,A	US 5 884 824 A (SPRING, JR. ET AL) 23 March 1999 (1999-03-23) * figure 1 *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			B60R
The present search report has been drawn up for all claims			
Place of search Berlin		Date of completion of the search 29 June 2006	Examiner Scheuer, J
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 06 11 1331

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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29-06-2006

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REFERENCES CITED IN THE DESCRIPTION

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